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PATENT ABSTRACTS OF JAPAN

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(71)Applicant : NIITSU:KK

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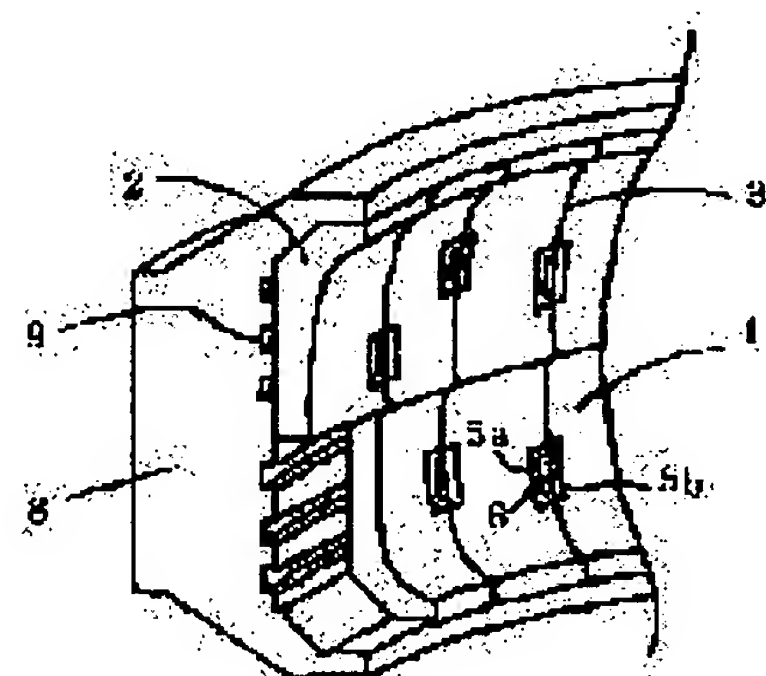
(72)Inventor : AONO FUMIKO
KOBAYASHI YOKO

(54) MOLD FOR MOLDING TIRE

(57)Abstract:

PURPOSE: To provide a mold for molding tire constituted so as to simply ensure a minute gap permitting air to pass but preventing the protrusion of rubber at the time of the vulcanization molding of a non-spew tire and capable of preventing and suppressing the deformation of the gap caused by the washing and cleaning of the mold and a change with the elapse of time.

CONSTITUTION: A pair of air venting flat plates 5a, 5b are inserted and fixed at the position where air between a mold and a tire is ready to remain in the contact surface of the mold and the tire at the time of the vulcanization molding of a tire. The flat plate 5a to which depressing processing is applied and the flat plate 5b to which no depressing processing is applied are mutually fitted to ensure a gap 6 and the air passing through this gap is excluded to the outside through the groove 9 of a rear holder 8. The flat plates 5a, 5b are arbitrarily arranged at a position where air is easy to accumulate without being limited by the arranging place of them or the number of them. In a split sector mold (split mold), the flat plates are inserted in and fixed to the mutual mating surface of small pieces.



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CLAIMS

[Claim(s)]

[Claim 1] Two or more division sectors which give a tread pattern to a product tire. It consists of tooth-back electrode holders which carry out the purpose of the non-spew tire shaping, and attach ****, two or more small pieces, and it. Air passes between each smallness piece in the metal mold which makes annular as a whole. In order to prepare a minute clearance without the Hami **** of rubber, the pair of the plate into which minute irregularity is processed beforehand, and a plate without minute irregularity processing is combined. The tire molding die characterized by making the air hole which secures the minute clearance between air vents and passes to the minute clearance by inserting and fixing between each smallness piece penetrate to a tooth back.

[Claim 2] The tire molding die which carries out pad immobilization of the plate of the aforementioned pair in the location of arbitration, and is characterized by making the air hole which leads at the minute clearance between monotonous penetrate to a tooth back in 2 rate metal mold (it is called full mold) divided into two in the tire hoop direction other than the metal mold (it is called rate mold) which consists of said division sector.

[Claim 3] The corner (10) of said minute clearance part between monotonous is a tire molding die according to claim 1 or 2 which gives minute R of 0.2 or less MMs, and is characterized by being a clearance between 0.1 or less MMs under working temperature.

[Claim 4] The degree of hardness of said monotonous quality of the material of the pair which processes the minute clearance beforehand, inserts and is fixed is a tire molding die according to claim 1 or 2 characterized by being 140 or more Vickers hardness HV, and the monotonous pad depth (H) being 3 or more MMs.

[Claim 5] Said monotonous minute irregularity processing is processed by which approaches, such as the NC machine tool processing method, the electric corrosion (EDM) processing method, and the etching processing method. Two or more sector part sprit mold (rate mold) ** the insertion fixed approach of a between [each piece] The tire molding die according to claim 1 or 2 which either a bis-stop, adhesives and piece clamping force and the two compound approaches or more are sufficient as, and is characterized by being based on the approach of embedding without those with adhesives or adhesives in 2 sprit molds (full mold).

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DETAILED DESCRIPTION**[Detailed Description of the Invention]**

[0001]

[Industrial Application] In the vulcanization molding die of a non spew tire, air passes, and this invention secures a minute clearance without the Hami **** of rubber easily, and prevents wear of the minute clearance by metal mold washing cleaning, and relates to the process of the tire molding die which closes aging of the minute clearance at the time of metal mold use if it is smallness.

[0002]

[Description of the Prior Art] Although the vulcanization molding die of a non spew tire has structure which extracts air from a minute clearance, as for the quality of the material of metal mold, aluminum, die cast aluminum, cast iron, and various kinds of other things are used. Generally the metal mold washes by the shot-blasting method in order to remove [which carries out continuous molding of the number of tires 100 duty] the dirt of metal mold weekly [about]. While repeating this washing repeatedly, sagging which the angle of a minute clearance is worn out and crushed and says commonly like the dotted line of drawing 7 occurs. This sagging closes a minute clearance and stops achieving the original mission of extracting air. so that it is the quality of the material especially comparatively soft like aluminum and die cast aluminum -- this sagging -- large -- and it generates at an early stage.

[0003] If this sagging occurs and air stops falling out at the time of vulcanization shaping of a tire, air will remain between metal mold and a tire, a cavity (bubble) will be formed in the front face of a product tire, the appearance of a tire will be spoiled remarkably, and commodity value will be reduced. If a cavity (bubble) occurs into a tire for this reason, after demounting metal mold from a tire vulcanization making machine each time and decomposing the piece of metal mold, it is necessary to remove sagging by the file or handicraft, such as **, one by one, and to include in metal mold again. The energy of the excessive time amount spent on this repair and a help reaches a considerable amount, and does not have besides [useless / thing].

[0004]

[Problem(s) to be Solved by the Invention] ***** which abolishes sagging generating of the corner of the minute clearance between metal mold, or can perform the generating in order that ***** made into the purpose of this invention may prevent formation of the cavity (bubble) of the front face which spoils the appearance of a tire -- it is in things.

[0005]

[Means for Solving the Problem] In order to delay generating prevention or its generating of sagging, the following two means are taken into consideration in this invention. The 1st means is delaying generating of sagging compared with the thing of the angle of the right angle which does not give R by giving R below 0.2 MM to the angle of a minute clearance, and the 2nd means is constituting a minute clearance from the 140 or more Vickers hardness HV hard quality of the material, in order to make sagging of the minute clearance section hard to generate.

[0006]

Generally it is an iron system alloy (with no hardening). HV 200-300 (those with hardening) 400 to HV550 cemented carbide HV500 Although it is above and a technical problem is solved by using these ingredients, it does not adhere to the above-mentioned ingredient especially. The ingredient should be selected after taking workability and economical efficiency into consideration enough.

[0007]

[Function] In the result of an experiment, generating of sagging was able to be made late five to 8 times with said 1st means. Moreover, the effectiveness of being about ten times many as this was acquired by suppression of sagging generating by combining this both-hands stage with the 2nd means, since about 1/10 of the amounts of generating sagging

was controlled to 3.

[0008]

[Example] the inside 1 of the metal mold which gives a tire-tread pattern -- setting -- the division sector metal mold (rate mold) of drawing 1 -- the mating face 3 of each smallness piece 2 -- moreover, in 2 sprit molds (full mold) of drawing 2, plate 5a and plate 5b without minute processing which processed the minute crevice on the location 4 of arbitration separately, respectively are made into a pair, and insertion immobilization is carried out. In this case, processing grant of the crevice 6 below 0.1 MM is carried out at plate 5a, and plate 5b does not have processing of a crevice, while it has been monotonous. Air cannot escape easily and the plates 5a and 5b arranged at the metal mold inside 1 are altogether arranged in the location which is easy to be covered, in case vulcanization shaping of the tire is carried out.

[0009] The depth direction dimension H of Plates 5a and 5b is in the range of $H \geq 3\text{MM}$, and is good by thickness [of the small piece 2] T, and below the tread ring thickness of 2 rate metal mold (full mold). As for a crevice 6, H is connected with an air hole 7 when sufficiently smaller than T. Furthermore, it connects with the slot 9 of an electrode holder 8, and the air of the contact surface of a tire and metal mold is discharged by the aeration of 6->7->9 outside, and an air hole 7 loses the residual of the air in the metal mold inside 1.

[0010] Since it can standardize beforehand, Plates 5a and 5b are manufactured in large quantities in advance, and when required, they can embed a dimension, the quality of the material, the processing approach, etc. in the required part of metal mold. Moreover, although Plates 5a and 5b are made into the configuration and the quality of the material in consideration of endurance, if the permeability of a minute clearance should still worsen in a certain accident, it is the length replaced with the new plates 5a and 5b which have manufactured only the part in advance, and the technical problem made into the purpose of this invention is solved.

[0011]

[Effect of the Invention] Since the effectiveness are about ten times many as this is acquired by prevention and suppression of sagging generating of a clearance by adopting this invention compared with the conventional thing, when reduce the incidence rate of the poor appearance tire by poor aeration and getting, the count of metal-mold repair can be downed certainly, and since a repair activity also becomes easy and can repair without skillful advanced skill further in a short time, the remarkable effectiveness that the downtime of the part tire production can decrease is acquired.

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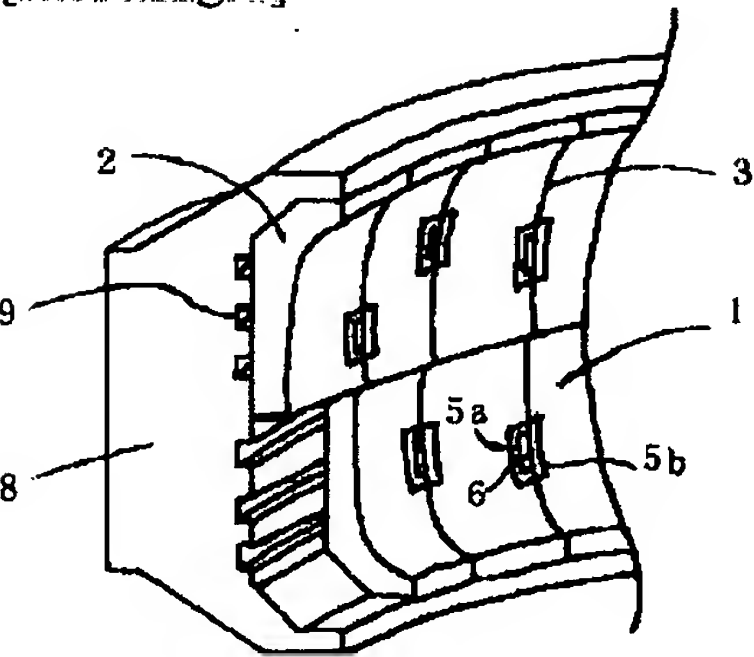
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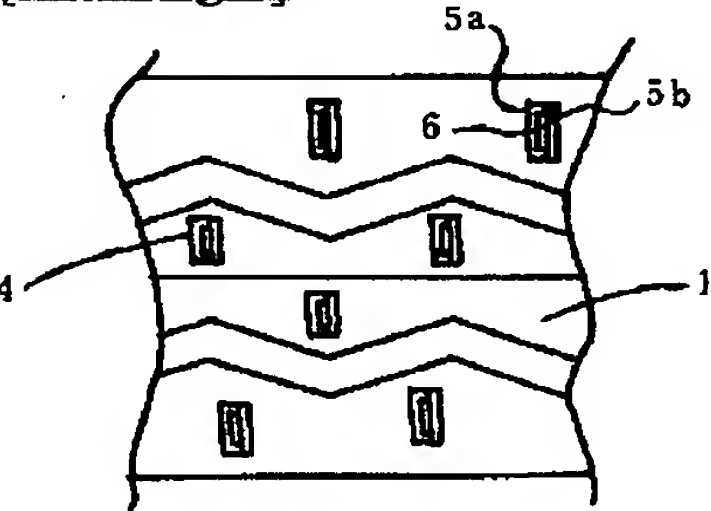
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DRAWINGS

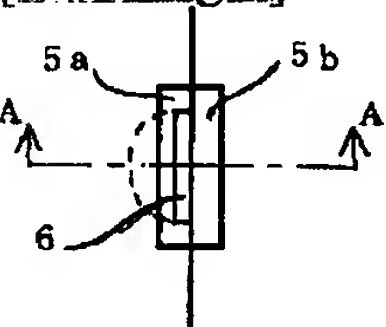
[Drawing 1]



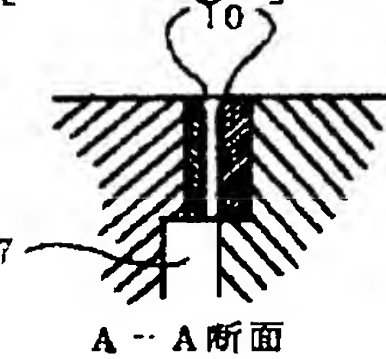
[Drawing 2]



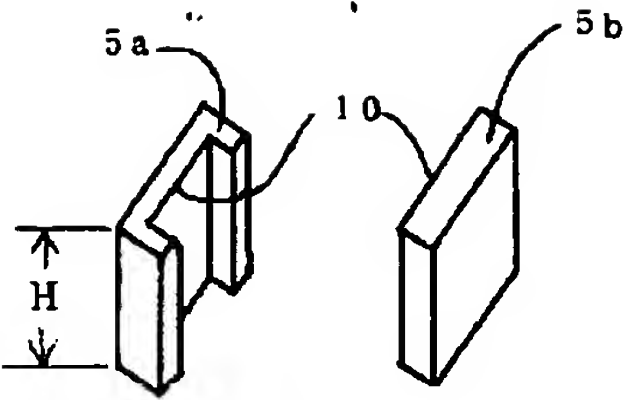
[Drawing 4]



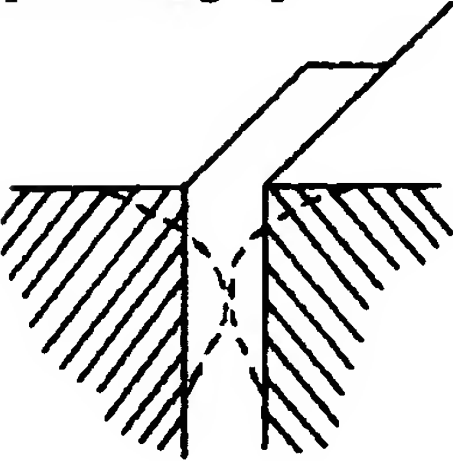
[Drawing 5]



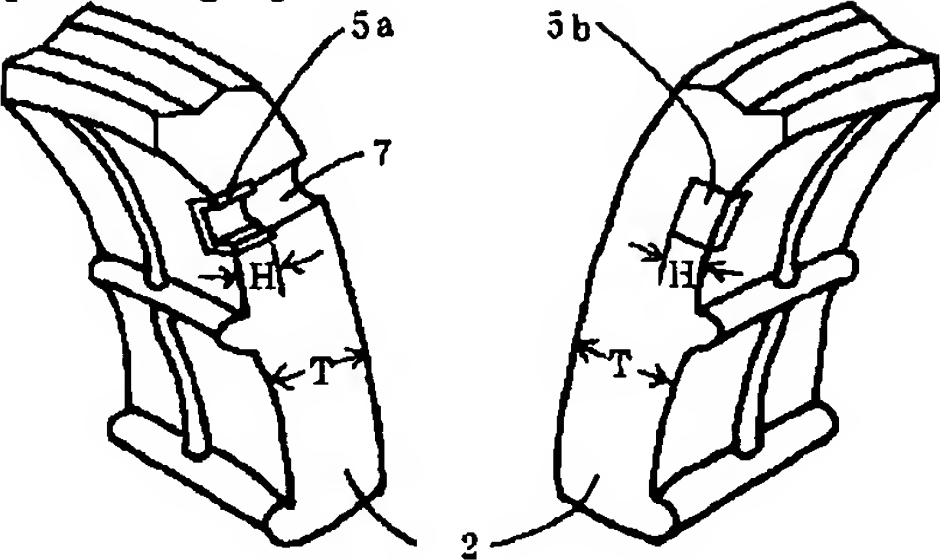
[Drawing 6]



[Drawing 7]



[Drawing 3]



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Patent Abstracts of Japan

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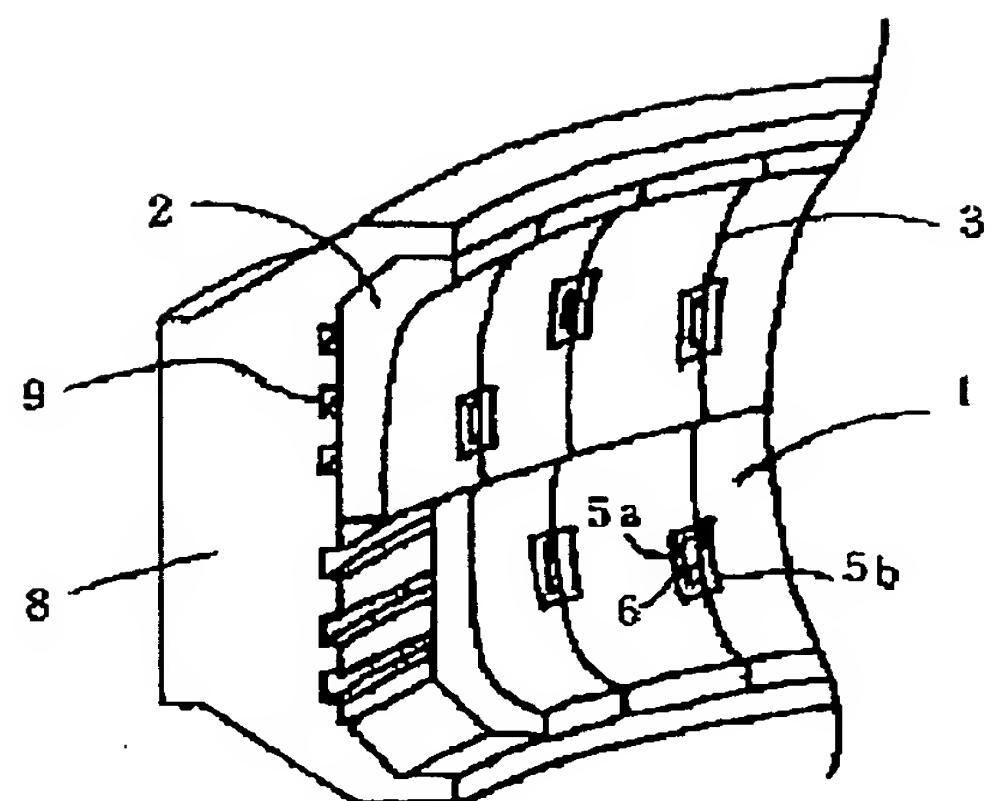
APPLICATION DATE : 01-09-94
APPLICATION NUMBER : 06230222

APPLICANT : NIITSU:KK;

INVENTOR : KOBAYASHI,YOKO.

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TITLE : MOLD FOR MOLDING TIRE



ABSTRACT : PURPOSE: To provide a mold for molding tire constituted so as to simply ensure a minute gap permitting air to pass but preventing the protrusion of rubber at the time of the vulcanization molding of a non-spew tire and capable of preventing and suppressing the deformation of the gap caused by the washing and cleaning of the mold and a change with the elapse of time.

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(71)出願人 594062695

有限会社新津

埼玉県狭山市大字北入曾1508-73 西武フ
ラワーヒル70-3

(72)発明者 青野 芙美子

埼玉県狭山市大字北入曾1508-73 西武フ
ラワーヒル 70-3

(72)発明者 小林 葉子

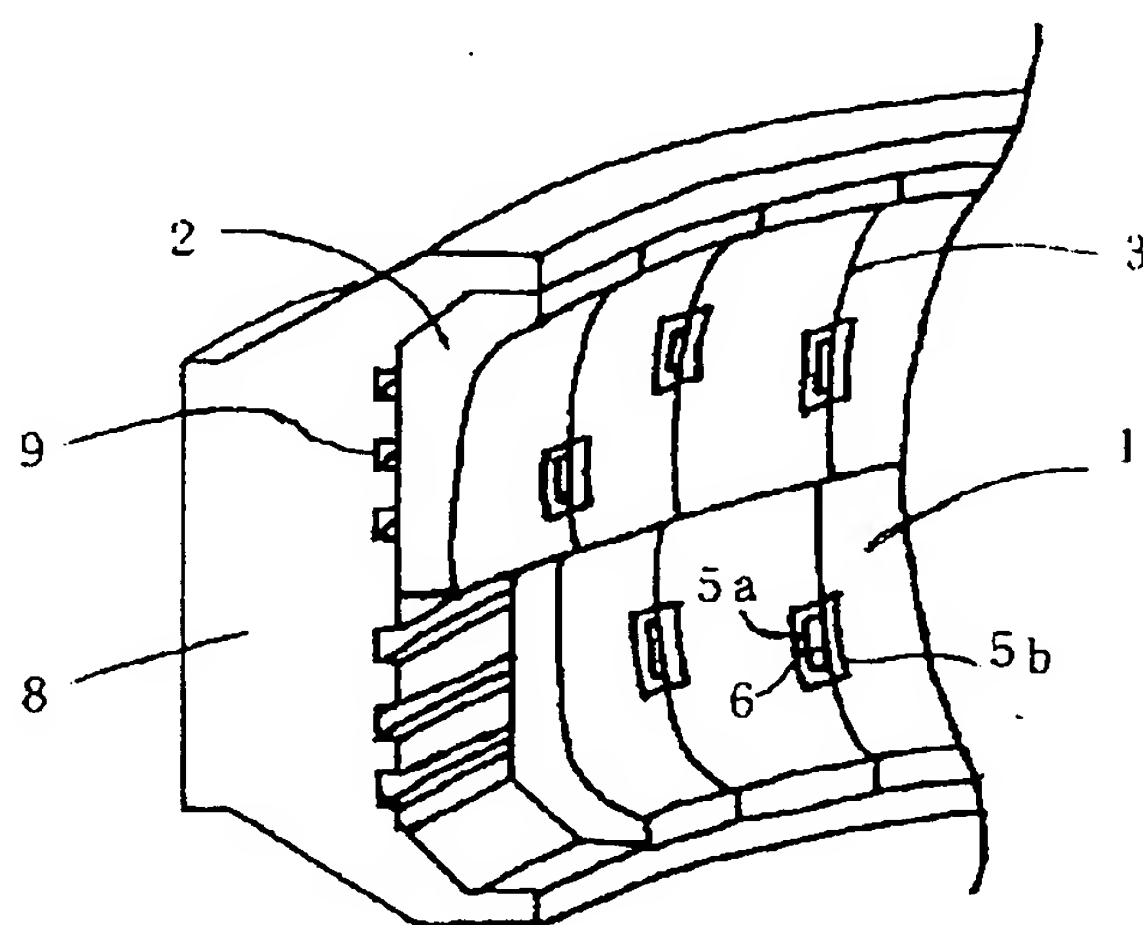
愛媛県松山市松江町5の55 三津浜住宅
1-203号

(54)【発明の名称】 タイヤ成形用金型

(57)【要約】

【目的】 ノンスピュータイヤの加硫成形時に於て、空気を透過しゴムがハミ出ない微小隙間を簡便に確保し、金型洗浄クリーニング、その他の経時変化による隙間のダレ防止、及び抑制を可能にしたタイヤ製造用金型を提供することが目的である。

【構成】 タイヤ加硫成形時に、金型とタイヤが接触する面1に於て、金型とタイヤ間の空気が残留し易い位置に空気抜きの為の一对の平板5a、5bを挿入し固定する。凹加工を施した平板5aと凹加工なしの平板5bを合せて隙間6を確保し、この隙間を通過した空気は背面のホルダー8の溝9を通じて外部に排除される。平板5a、5bの配置場所、個数に制限はなく、空気の溜り易い位置に任意に配置される。時に分割セクター金型(割モールド)では、小ピース2同志の合せ目3に挿入固定される。



【特許請求の範囲】

【請求項 1】 製品タイヤにトレッドパターンを付与する複数個の分割セクターが、ノンスピュータイヤ成形を目的として、複数の小ピースとそれを組付ける背面ホルダーで構成され、全体として環状をなす金型に於て、各小ピース間に空気が通過し、且つ、ゴムのハミ出さない微小隙間を設ける為に、予め微小凹凸が加工されている平板と微小凹凸加工なしの平板との一対を組合せて、各小ピース間に挿入し固定する事により空気抜き微小隙間を確保し、その微小隙間に通ずる通気孔を背面迄貫通させたことを特徴とするタイヤ成形用金型。

【請求項 2】 前記分割セクターよりなる金型（割モールドという）の他に、タイヤ周方向に 2 分割した 2 つ割り金型（フルモールドという）に於て、任意の位置に前記の一対の平板を埋込み固定し、その平板間の微小隙間に通じる通気孔を背面迄貫通させたことを特徴とするタイヤ成形用金型。

【請求項 3】 前記平板間の微小隙間部分の角部（10）は 0.2 MM 以下の微小 R を付与し、且つ作業温度下に於て 0.1 MM 以下の隙間であることを特徴とする請求項 1 又は 2 記載のタイヤ成形用金型。

【請求項 4】 予め微小隙間を加工しておき挿入し固定する一対の前記平板の材質の硬度はビッカース硬度 HV 140 以上で、且つ平板の埋込み深さ（H）が 3 MM 以上であることを特徴とする請求項 1 又は 2 記載のタイヤ成形用金型。

【請求項 5】 前記平板の微小凹凸加工は、数値制御工作機械加工法、電食（EDM）加工法、エッチング加工法等いずれかの方法で加工され、複数セクター分割金型（割モールド）では各ピース間への挿入固定方法は、ビス止め、接着剤、及びピース締付力のみのいずれか又は 2 つ以上の複合方法でも良く、2 つ割金型（フルモールド）では接着剤有り又は接着剤無しの埋込み方法によることを特徴とする請求項 1 又は 2 記載のタイヤ成形用金型。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明はノンスピュータイヤの加硫成形用金型に於て、空気が通過しゴムのハミ出さない微小隙間を容易に確保し、且つ、金型洗浄クリーニングによる微小隙間の磨滅を防ぎ、金型使用時に於ける微小隙間の経時変化を小ならしめるタイヤ成形用金型の製法に関するものである。

【0002】

【従来の技術】 ノンスピュータイヤの加硫成形用金型は、微小隙間より空気を抜く構造となっているが、金型の材質はアルミ、ダイガストアルミ、鋳鉄、その他各種のものが使われている。その金型はタイヤ数百本分を連続成形する約 1 週間毎に金型の汚れを落す為、一般的にはショットブラスト法により洗浄を行う。この洗浄を何

回も繰返すうちに、微小隙間の角が図 7 の点線の如く磨滅して潰れ、俗にいうダレが発生する。このダレが微小隙間を閉鎖して、空気を抜くという本来の使命を果たさなくなる。特にアルミ、ダイガストアルミの如く、比較的軟らかい材質であればある程このダレは大きく且つ早期に発生する。

【0003】 このダレが発生し、タイヤの加硫成形時に空気が抜けなくなると、金型とタイヤとの間に空気が残留し、製品タイヤの表面に空洞（バブル）を形成して、タイヤの外観を著しく損ない、商品価値を低下させる。この為、タイヤに空洞（バブル）が発生すると、その都度金型をタイヤ加硫成形機より取外し、金型のピースを分解した後、ダレを 1 つ 1 つヤスリかけ等の手作業で取除き、再び金型に組込む必要がある。この補修にかかる余計な時間と人手のエネルギーは相当量にのぼり、無駄なことこの上もない。

【0004】

【発明が解決しようとする課題】 本発明の目的とするところは、タイヤの外観を損う表面の空洞（バブル）の形成を防止する為に、金型の微小隙間の角部のダレ発生を無くす、乃至は、その発生を出来る丈遅らせることにある。

【0005】

【課題を解決するための手段】 ダレの発生防止ないしはその発生を遅らせる為に、本発明では次の 2 つの手段を考慮する。第 1 の手段は、微小隙間の角に 0.2 MM 以下の R を付与することにより、R を付与しない直角の角のものに比べてダレの発生を遅らせることであり、第 2 の手段は、微小隙間部のダレの発生をしにくくする為に、ビッカース硬度 HV 140 以上の硬い材質で微小隙間を構成することである。

【0006】

一般的に鉄系合金（焼入れ無し） HV 200～300
（焼入れ有り） HV 400～550

超硬合金 HV 500 以上

であり、これらの材料を用いることにより課題は解決されるが、特に上記の材料にこだわるものではない。加工性、経済性を十分考慮の上、材料を選定すべきである。

【0007】

【作用】 実験の結果では、前記第 1 の手段により、ダレの発生を 5～8 倍遅くすることが出来た。又、第 2 の手段により、発生ダレ量を約 1/3 に抑制出来た為、この両手段を組合せることにより、ダレ発生の抑止に十数倍の効果が得られた。

【0008】

【実施例】 タイヤトレッドパターンを付与する金型の内面 1 に於いて、図 1 の分割セクター金型（割モールド）では、各小ピース 2 の合せ面 3 に、又、図 2 の 2 つ割金型（フルモールド）では任意の位置 4 に、夫々別途微小凹部を加工した平板 5 a と微小加工なしの平板 5 b を一

3

対にして挿入固定する。この場合、平板5aには0.1 M M以下の凹部6が加工付与されており、平板5bは平板のままで凹部の加工はない。金型内面1に配置される平板5a, 5bは、タイヤが加硫成形される際、空気が逃げにくく、溜り易い位置に全て配置される。

【0009】平板5a, 5bの深さ方向寸法Hは、 $H \geq 3 \text{ MM}$ の範囲にあり、小ピース2の厚みT及び2つ割り金型（フルモールド）のトレッドリング厚み以下が良い。HがTよりも十分小さい場合、凹部6は通気孔7と接続される。更に通気孔7はホルダー8の溝9に接続され、タイヤと金型との接触面の空気は、 $6 \rightarrow 7 \rightarrow 9$ の通気により外部へ排出され、金型内面1での空気の残留を無くす。

【0010】平板5a, 5bは寸法、材質、加工方法等、前もって標準化出来るので、事前に大量に製作しておき、必要な時点で金型の必要な個所に埋込むことが出来る。又、平板5a, 5bは耐久性を考慮した形状、材質にしてあるが、それでも万一何等かのアクシデントで微小隙間の通気性が悪くなった場合、その個所のみを事前に製作してある新品の平板5a, 5bと取替える丈

で、本発明の目的とする課題は解決される。

【0011】

【発明の効果】従来のものに比べ、本発明を採用することにより、隙間のダレ発生の防止及び抑止に十数倍の効果が得られる為、通気不良による外観不良タイヤの発生率を低下せうる上、金型補修回数が確実にダウン出来、更に、補修作業も簡単となり、高度な熟練技能なしで短時間に補修出来る為、その分タイヤ生産の中断時間

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を減少出来るという顕著な効果が得られる。

【図面の簡単な説明】

【図1】平板5a, 5bを挿入した分割セクター金型（割モールド）の斜視図である。

【図2】平板5a, 5bを挿入した2つ割り金型（フルモールド）の内面より見た平面図である。

【図3】分割セクターに組込まれる小ピースの合せ目に平板5a, 5bが固着された状態での斜視図である。

【図4】小ピースを合せた状態で、平板5a, 5bが一对で接している事を示す平面図である。

【図5】図4のA-A矢視方向の断面図を示す。

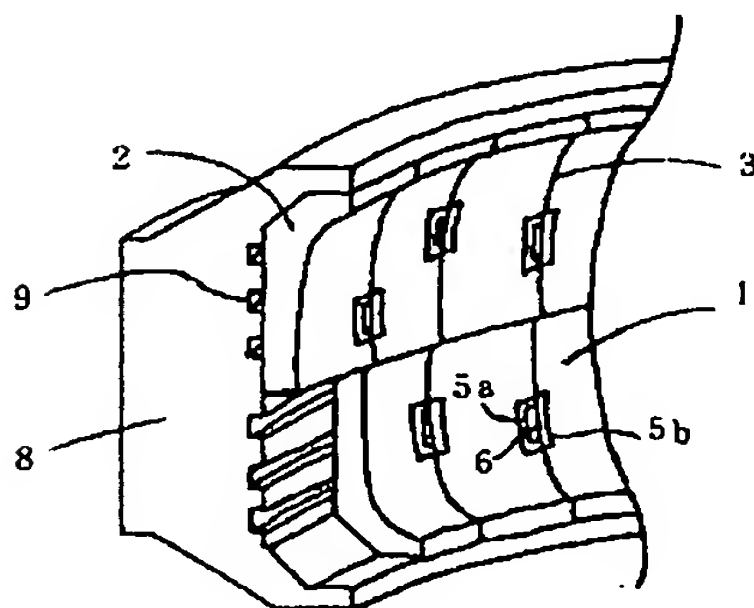
【図6】平板5a, 5bの斜視図である。

【図7】平板5a, 5bにて構成される微小隙間の新品時（実線）と経時変化によるダレ発生時（点線）を示す断面斜視図である。

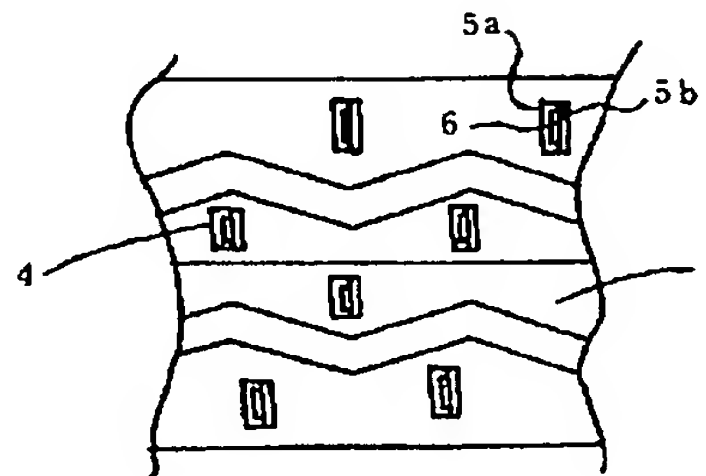
【符号の説明】

- 1 金型の内面
- 2 小ピース
- 3 小ピース合せ目
- 4 平板挿入の任意位置
- 5a, 5b 平板
- 6 平板5aの凹加工部
- 7 通気孔
- 8 ホルダー
- 9 ホルダーの内面溝
- 10 平板の角部
- H 平板の埋込深さ方向の寸法
- T 小ピースの厚み寸法

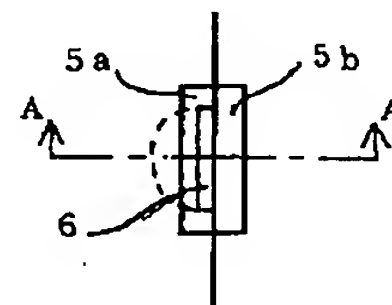
【図1】



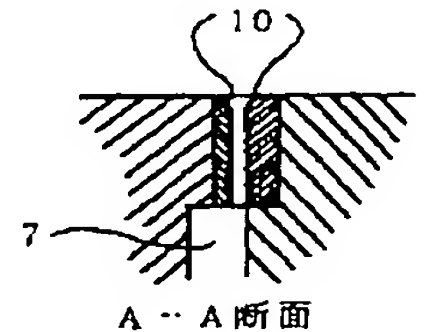
【図2】



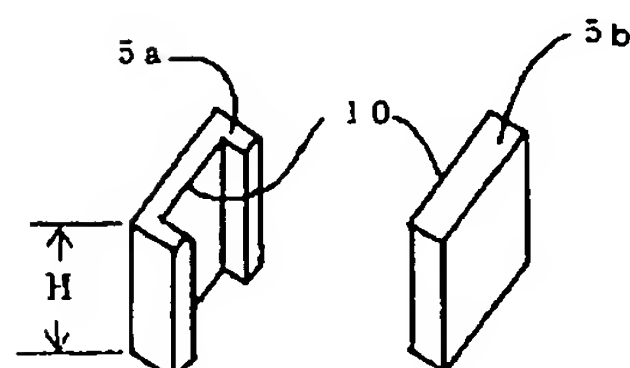
【図4】



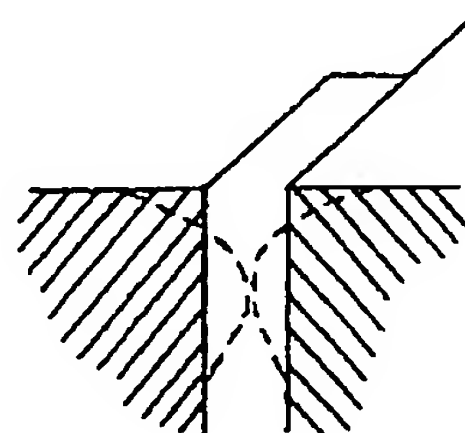
【図5】



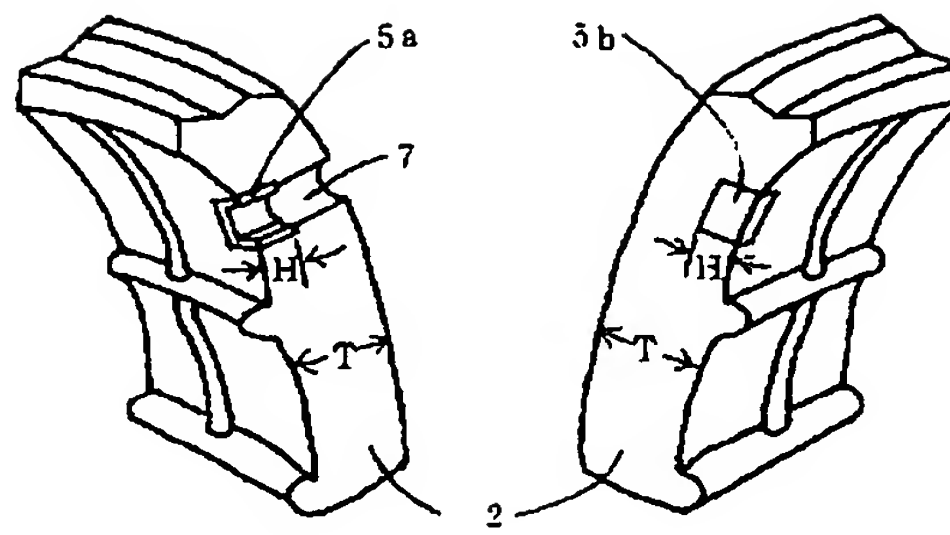
【図6】



【図7】



【図 3】



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